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Titel: Wie wahr sind die Thesen von Ray Kurzweil?

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Kapitel 1

Einleitung

In dieser Arbeit werden die Thesen von Ray Kurzweil von Ende der 80er bis heute beschrieben und auf ihren Wahrheitsgehalt untersucht. Ray Kurzweil hat sich einen Namen in der Zukunftsforschung durch zeitgenaue Vorhersagen von technischen Entwicklungen gemacht. In den 80er und 90er Jahren hat er durch seine veröffentlichten Bücher „The Age of Intelligent Machines“und „The Age of Spiritual Machines“eine Vielzahl an Thesen bis 2009 aufgestellt. Im Oktober 2010 erschien ein Essay von Kurzweil mit dem Titel „How my predictions are faring“, in dem er seine Prognosen auswertet. Demzufolge sind nach eigener Aussage 86% seiner Thesen im Wesentlichen korrekt. Diese Aussage wird im Rahmen dieser Arbeit untersucht. Am Anfang wird die Person Ray Kurzweil kurz vorgestellt, danach folgt eine Übersicht zu seinen Vorhersagen bis 2009. Anschließend werden diese mit seiner Auswertung und Fakten der Realität verglichen.

Kapitel 2

Zur Person Ray Kurzweil

Ray Kurzweil wurde am 12. Februar 1948 in New York geboren. Er gilt als Autor, Erfinder, Futurist und Transhumanist[1]. Seit Dezember 2012 arbeitet er als Leiter der technischen Entwicklung bei Google[Let12]. Seinen Abschluss machte er 1970 am renomierten MIT (Massechusetts Institute of Technology) in den Fachrichtungen Informatik und Literatur. Im Jahre 1983 gründete er die Firma Kurzweil Music Systems zur Herstellung von Synthesizern und entwickelte 1984 den Kurzweil K250 Synthesizer, das erste Keyboard, welches den Klang von Musikinstrumenten wiedergeben kann und schreibt damit Musikgeschichte. In seiner Karriere erhielt Ray Kurzweil schon mehrere bedeutende Auszeichnungen. Vom amerikanischen Präsidenten Bill Clinton bekam er 1999 die National Medal of Technology, die höchste Auszeichnung im Bereich der Technologie in den Vereinigten Staaten, überreicht. Im Jahr 2002 wurde Kurzweil in die National Investors Hall of Fame aufgenommen[Spo]. Bill Gates spricht von ihm als „führendem Experten im Bereich der Künstlichen Intelligenz“. Außerdem entwickelte er 1975 den ersten CCD-Flachbett-Scanner[Mai06] und [Kur]. Ebenso viel Erfolg hat Ray mit seiner Reading Machine aus dem Jahr 1978, einem Computer, der Texte einscannen und vorlesen kann. Ein echter Meilenstein für Nichtsehende, der auch Superstars wie Stevie Wonder oder Ray Charles begeistert[Kur].

[1] Transhumanismus bezeichnet eine Klasse philosophischer Denkrichtungen, die eine prinzipielle Erweiterung menschlicher Fähigkeiten und Möglichkeiten durch den gezielten Einsatz von Rationalität, Wissenschaft und Technik befürworten und fördern. Quelle: www.transhumanismus.eu

Kapitel 3

Die Vorhersagen von Kurzweil

In dieser Arbeit werden die Vorhersagen Kurzweils aus den Büchern „The Age of Intelligent Machines“[Kur92] und „The Age of Spiritual Machines“[Kur00] vorgestellt. Das erste Buch „The Age of Intelligent Machines“[Kur92] wurde 1990 veröffentlicht. In diesem Werk sagt er zum Beispiel das explosive Wachstum in der weltweiten Internetnutzung voraus. Außerdem prophezeite er den Untergang der Sowjetunion aufgrund von neuen Technologien wie Mobiltelefonen und Faxgeräten. Dadurch sei die autoritäre Regierung in der staatlichen Kontrolle des Informationsflusses entmachtet worden[Kur92, S.446]. Dies wurde vom damaligen Präsidenten der Sowjetunion Michail Gorbatschow in einem Gespräch mit Ray Kurzweil im Jahre 2005 als „großer Faktor “bestätigt[Kur05]. Eine weitere Vorhersage Kurzweils ist der Sieg eines Schachcomputers gegen die besten menschlichen Spieler bis zum Jahr 2000 [Kur92, S.133]. Dies ist im Jahre 1997 dann auch eingetreten. Der von IBM hergestellte Schach-Computer "Deep Blueßchlug den damaligen Weltmeister Gary Kasparov in einem unter Turnier-Bedingungen stattgefunden Spiel mit 6 Partien[Mie11]. Der Endstand lautete nach 6 Spielen 3,5 zu 2,5 für den IBM-Computer[1]

Sein zweites Buch „The Age of Spiritual Machines“[Kur00] enthält 147 Vorhersagen, die er in Dekaden eingeteilt hat. Auch in diesem Fall wird es in dieser Arbeit nur um die Thesen bis 2009 gehen. Außerdem hat er seine Vorhersagen nochmals in Kategorien eingeteilt. Folgende Thesen hat Ray Kurzweil für den Zeitraum bis 2009 aufgestellt:

1. Kategorie Computer

    - Individuals primarily use portable computers.
    - Portable computers will have become dramatically lighter and thinner than the notebook computers of ten years earlier.
    - Personal computers are available in a wide range of sizes and

[1] `http://www.chessgames.com/player/deep_blue.html?kpage=8`

shapes, and are commonly embedded in clothing and jewelry such as wristwatches, rings, earrings and other body ornaments.

- Computers with a high-resolution visual interface range from rings and pins and credit cards up to the size of a thin book.
- People typically have at least a dozen computers on and around their bodies, which are networked using "body LANs" (local area networks).
- For the most part, these truly personal computers have no moving parts. Memory is completely electronic.
- Most portable computers do not have keyboards.
- Most users have servers in their homes and offices where they keep large stores of digital "objects," including their software, databases, documents, music, and movies.
- Digital objects such as books, music albums, movies, and software are rapidly distributed as data files through the wireless network, and typically do not have a physical object associated with them.
- Most users have servers where they keep digital "objects" such as virtual reality environments (although these are still at an early stage).
- There are services to keep one's digital objects in central repositories, but most people prefer to keep their private information under their own physical control.
- Cables are disappearing. Communication between components, such as pointing devices, microphones, displays, printers, and the occasional keyboard uses short-distance wireless technology.
- Computers routinely include wireless technology to plug into the ever-present worldwide network, providing reliable, instantly available, very high bandwidth communication.
- The majority of text is created using continuous speech recognition (CSR) dictation software, but keyboards are still used. CSR is very accurate, far more so than the human transcriptionists who were used up until a few years ago.
- Also ubiquitous are language user interfaces (LUIs), which combine continuous speech recognition (CSR) and natural language understanding. For routine matters, such as simple business transactions and information inquiries, LUIs are quite responsive and precise. They tend to be narrowly focused, however, on specific types of tasks. LUIs are frequently combined with animated personalities. Interacting with an animated personality to conduct a purchase or make a reservation is like talking to a person using videoconferencing, except that the person is simulated.

- Computer displays have all the display qualities of paper — high resolution, high contrast, large viewing angle, and no flicker. Books, magazines, and newspapers are now routinely read on displays that are the size of, well, small books.
- Computer displays built into eyeglasses are also used. These specialized glasses allow users to see the normal visual environment, while creating a virtual image that appears to hover in front of the viewer. The virtual images are created by a tiny laser built into the glasses that projects the images directly onto the user's retinas.
- Computers routinely include moving picture image cameras and are able to reliably identify their owners from their faces.
- In terms of circuitry, three-dimensional chips are commonly used, and there is a transition taking place from the older single-layer chips.
- Sound producing speakers are being replaced with very small chip-based devices that can place high-resolution sound anywhere in three-dimensional space. This technology is based on creating audible frequency sounds from the spectrum created by the interaction of very high frequency tones. As a result, very small speakers can create very robust three-dimensional sound.
- A $1,000 personal computer can perform about a trillion calculations per second.
- Supercomputers match at least the hardware capacity of the human brain — 20 million billion calculations per second (20 petaflops).
- Unused computes on the Internet are being harvested, creating virtual parallel supercomputers with human brain hardware capacity.
- There is increasing interest in massively parallel neural nets, genetic algorithms and other forms of "chaotic" or complexity theory computing, although most computer computations are still done using conventional sequential processing, albeit with some limited parallel processing.
- Autonomous nanoengineered machines (i.e., machines constructed atom by atom and molecule by molecule) have been demonstrated and include their own computational controls. However, nanoengineering is not yet considered a practical technology.
- Research has been initiated on reverse-engineering the human brain through both destructive scans of the brains of recently deceased persons as well as noninvasive scans using highresolution magnetic resonance imaging (MRI) of living persons and animals.

2. Bildung

   - In the twentieth century, computers in schools were mostly on the trailing edge, with most effective learning from computers taking place in the home. Now in 2009, while schools are still not on the cutting edge, the profound importance of the computer as a knowledge tool is widely recognized.
   - Computers play a central role in all facets of education, as they do in other spheres of life.
   - The majority of reading is done on displays, although the ïnstalled baseöf paper documents is still formidable.
   - The generation of paper documents is dwindling, however, as the books and other papers of largely twentieth-century vintage are being rapidly scanned and stored.
   - Documents circa 2009 routinely include embedded moving images and sounds.
   - Students of all ages typically have a computer of their own, which is a thin tabletlike device weighing under a pound with a very high resolution display suitable for reading.
   - Students interact with their computers primarily by voice and by pointing with a device that looks like a pencil.
   - Keyboards still exist, but most textual language is created by speaking.
   - Learning materials are accessed through wireless communication.
   - Intelligent courseware has emerged as a common means of learning.
   - Recent controversial studies have shown that students can learn basic skills such as reading and math just as readily with interactive learning software as with human teachers, particularly when the ratio of students to human teachers is more than one to one. Although the studies have come under attack, most students and their parents have accepted this notion for years.
   - The traditional mode of a human teacher instructing a group of children is still prevalent, but schools are increasingly relying on software approaches, leaving human teachers to attend primarily to issues of motivation, psychological well-being, and socialization.
   - Many children learn to read on their own using their personal computers before entering grade school.
   - Preschool and elementary school children routinely read at their intellectual level using print-to-speech reading software until their reading skill level catches up.

- These print-to-speech reading systems display the full image of Page 138 documents, and can read the print aloud while highlighting what is being read.
- Synthetic voices sound fully human.
- Although some educators expressed concern in the early '00 years that students would rely unduly on reading software, such systems have been readily accepted by children and their parents.
- Studies have shown that students improve their reading skills by being exposed to synchronized visual and auditory presentations of text.
- Learning at a distance (for example, lectures and seminars in which the participants are geographically scattered) is commonplace.
- Learning is becoming a significant portion of most jobs.
- Training and developing new skills is emerging as an ongoing responsibility in most careers, not just an occasional supplement, as the level of skill needed for meaningful employment soars ever higher.

3. Behinderungen

- Persons with disabilities are rapidly overcoming their handicaps through the intelligent technology of 2009.
- Students with reading disabilities routinely ameliorate their disability using print-to-speech reading systems.
- Print-to-speech reading machines for the blind are now very small, inexpensive, palm-sized devices that can read books (those that still exist in paper form) and other printed documents, and other real-world text such as signs and displays.
- These reading systems are equally adept at reading the trillions of electronic documents that are instantly available from the ubiquitous wireless world-wide network.
- After decades of ineffective attempts, useful navigation devices have been introduced that can assist blind people in avoiding physical obstacles in their path, and finding their way around, using global positioning system (GPS) technology.
- A blind person can interact with her personal reading-navigation systems through two-way voice communication, kind of like a Seeing Eye dog that reads and talks.
- Deaf persons—or anyone with a hearing impairment—commonly use portable speech-to-text listening machines, which display a

real-time transcription of what people are saying. The deaf user has the choice of either reading the transcribed speech as displayed text, or watching an animated person gesturing in sign language. These have eliminated the primary communication handicap associated with deafness.

- Listening machines can also translate what is being said into another language in real time, so they are commonly used by hearing people as well.
- Computer-controlled orthotic devices have been introduced. These "walking machinesënable paraplegic persons to walk and climb stairs. The prosthetic devices are not yet usable by all paraplegic persons, as many physically disabled persons have dysfunctional joints from years of disuse. However, the advent of orthotic walking systems is providing more motivation to have these joints replaced.
- There is a growing perception that the primary disabilities of blindness, deafness, and physical impairment do not necessarily impart handicaps. Disabled persons routinely describe their disabilities as mere inconveniences. Intelligent technology has become the great leveler.

4. Kommunikation

    - Translating Telephone technology (where you speak in English and your Japanese friend hears you in Japanese, and vice versa) is commonly used for many language pairs. it is a routine capability of an individual's personal computer.
    - ...which also serves as her phone.
    - Telephonecommunication is primarily wireless.
    - ...and routinely includes high-resolution moving images.
    - Meetings of all kinds and sizes routinely take place among geographically separated participants.
    - There is effective convergence, at least on the hardware and supporting software level, of all media, which exist as digital objects (that is, files)
    - ...distributed by the ever-present high-bandwidth, wireless information web.
    - Users can instantly download books, magazines, newspapers, television, radio, movies, and other forms of software to their highly portable personal communication devices.
    - Virtually all communication is digital and encrypted...

- ...with public keys available to government authorities.
- Many individuals and groups, including but not limited to criminal organizations, use an additional layer of virtually unbreakable encryption codes with no third-party keys.
- Haptic technologies area emerging that allow people to touch and feel objects and other persons at a distance.
- These force-feedback devices are widely used in games and in training simulation systems.
- Interactive games routinely include all-encompassing visual and auditory environments...
- ...but a satisfactory, all-encompassing tactile environment is not yet available.
- The online chat rooms of the late 1990s have been replaced with virtual environments where you can meet people with full visual realism.
- People have sexual experiences at a distance with other persons as well as virtual partners.
- But the lack of the ßurroundtactile environment has thus far kept virtual sex out of the mainstream.
- Virtual partners are popular as forms of sexual entertainment, but they're more gamelike than real.
- And phone sex is a lot more popular now that phones routinely include high-resolution, real-time moving images of the person on the other end.

5. Betriebswirtschaft(Business and Economics)

- Despite occasional corrections, the ten years leading up to 2009 have seen continuous economic expansion and prosperity due to the dominance of the knowledge content of products and services.
- The greatest gains continue to be in the value of the stock market.
- Price deflation concerned economists in the early '00 years, but they quickly realized it was a good thing. The high-tech community pointed out that significant deflation had existed in the computer hardware and software industries for many years earlier without detriment.
- The United States continues to be the economic leader due to its primacy in popular culture and its entrepreneurial environment.
- Since information markets are largely world markets, the United States has benefited greatly from its immigrant history. Being comprised of all the world's peoples—specifically the descendants

of peoples from around the globe who had endured great risk for a better life—is the ideal heritage for the new knowledge-based economy.

- China has also emerged as a powerful economic player.
- Europe is several years ahead of Japan and Korea in adopting the American emphasis on venture capital, employee stock options, and tax policies that encourage entrepreneurship, although these practices have become popular throughout the world.
- At least half of all transactions are conducted online.
- Intelligent assistants which combine continuous speech recognition, natural-language understanding, problem solving, and animated personalities routinely assist with finding information, answering questions, and conducting transactions. Intelligent assistants have become a primary interface for interacting with information-based services, with a wide range of choices available. A recent poll shows that both male and female users prefer female personalities for their computer-based intelligent assistants. The two most popular are Maggie, who claims to be a waitress in a Harvard Square cafe, and Michelle, a stripper from New Orleans. Personality designers are in demand, and the field constitutes a growth area in software development.
- Most purchases of books, musical älbums,"videos, games, and other forms of software do not involve any physical object, so new business models for distributing these forms of information have emerged.
- One shops for these information objects by ßtrollingthrough virtual malls, sampling and selecting objects of interest, rapidly (and securely) conducting an online transaction, and then quickly downloading the information using high-speed wireless communication.
- There are many types and gradations of transactions to gain access to these products. You can "buyä book, musical album, video, etcetera, which gives you unlimited permanent access.
- Alternatively, you can rent access to read, view, or listen once, or a few times. Or you can rent access by the minute.
- Access may be limited to one person or to a group of persons (for example, a family or a company). Alternatively, access may be limited to a particular computer, or to any computer accessed by a particular person or by a set of persons.
- There is a strong trend toward the geographic separation of work groups. People are successfully working together despite living and working in different places.

- The average household has more than a hundred computers, most of which are embedded in appliances and built-in communication systems.
- Household robots have emerged, but are not yet fully accepted.
- Intelligent roads are in use, primarily for long-distance travel. Once your car's computer guidance system locks onto the control sensors on one of these highways, you can sit back and relax. Local roads, though, are still predominantly conventional.
- A company west of the Mississippi and north of the Mason-Dixon line has surpassed a trillion dollars in market capitalization.

6. Politik und Gesellschaft

   - Privacy has emerged as a primary political issue. The virtually constant use of electronic communication technologies is leaving a highly detailed trail of every person's every move.
   - Litigation, of which there has been a great deal, has placed some constraints on the widespread distribution of personal data.
   - Government agencies, however, continue to have the right to gain access to people's files...
   - ...which has resulted in the popularity of unbreakable encryption technologies.
   - There is a growing neo-Luddite movement, as the skill ladder continues to accelerate upwards.
   - As with earlier Luddite movements, its influence is limited by the level of prosperity made possible by new technology.
   - The movement does succeed in establishing continuing education as a primary right associated with employment.
   - There is continuing concern with an underclass that the skill ladder has left far behind. The size of the underclass appears to be stable, however.
   - Although not politically popular, the underclass is politically neutralized through public assistance and the generally high level of affluence.

7. Kunst

   - The high quality of computer screens, and the facilities of computer-assisted visual rendering software, have made the computer screen a medium of choice for visual art.
   - Most visual art is the result of a collaboration between human artists and their intelligent art software.

- Virtual paintings—high-resolution wall-hung displays—have become popular. Rather than always displaying the same work of art, as with a conventional painting or poster, these virtual paintings can change the displayed work at the user's verbal command, or can cycle through collections of art. The displayed artwork can be works by human artists or original art created in real time by cybernetic art software.
- Human musicians routinely jam with cybernetic musicians.
- The creation of music has become available to persons who are not musicians.
- Creating music does not necessarily require the fine motor coordination of using traditional controllers.
- Cybernetic music creation systems allow people who appreciate music but who are not knowledgeable about music theory and practice to create music in collaboration with their automatic composition software.
- Interactive brain-generated music, which creates a resonance between the user's brain waves and the music being listened to, is another popular genre.
- Musicians commonly use electronic controllers that emulate the playing style of the old acoustic instruments (for example, piano, guitar, violin, drums).
- ...but there is a surge of interest in the new äircontrollers in which you create music by moving your hands, feet, mouth, and other body parts.
- Other music controllers involve interacting with specially designed devices.
- Writers use voice-activated word processing...
- Grammar checkers are now actually useful.
- Distribution of written documents from articles to books typically does not involve paper and ink.
- Style improvement and automatic editing software is widely used to improve the quality of writing.
- Language translation software is also widely used to translate written works in a variety of languages.
- Nonetheless, the core process of creating written language is less affected by intelligent software technologies than the visual and musical arts. However, cyberneticäuthors are emerging.
- Beyond music recordings, images, and movie videos, the most popular type of digital entertainment object is virtual experience

software. These interactive virtual environments allow you to go. whitewater rafting on virtual rivers, to hang-glide in a virtual Grand Canyon, or to engage in intimate encounters with our favorite movie star.

- Users also experience fantasy environments with no counterpart in the physical world.
- The visual and auditory experience of virtual reality is compelling, but tactile interaction is still limited.

8. Krieg

   - The security of computation and communication is the primary focus of the U.S. Department of Defense. There is general recognition that the side that can maintain the integrity of its computational resources will dominate the battlefield.
   - Humans are generally far removed from the scene of battle.
   - Warfare is dominated by unmanned intelligent airborne devices.
   - Many of these flying weapons are the size of small birds, or smaller.
   - The United States continues to be the world's dominant military power, which is largely accepted by the rest of the world, as most countries concentrate on economic competition.
   - Military conflicts between nations are rare, and most conflicts are between nations and smaller bands of terrorists.
   - The greatest threat to national security comes from bioengineered weapons.

9. Gesundheit und Medizin

   - Bioengineered treatments have reduced the toll from cancer, heart disease, and a variety of other health problems.
   - Significant progress is being made in understanding the information processing basis of disease.
   - Telemedicine is widely used. Physicians can examine patients using visual, auditory, and haptic examination from a distance. Health clinics with relatively inexpensive equipment and a single technician bring health care to remote areas where doctors had previously been scarce.
   - Computer-based pattern recognition is routinely used to interpret imaging data and other diagnostic procedures.
   - The use of noninvasive imaging technologies has substantially increased.

- Diagnosis almost always involves collaboration between a human physician and a pattern-recognition-based expert system.
- Doctors routinely consult knowledge-based systems (generally through two-way voice communication augmented by visual displays), which provide automated guidance, access to the most recent medical research, and practice guidelines.
- Lifetime patient records are maintained in computer databases.
- Privacy concerns about access to these records (as with many other databases of personal information) have emerged as a major issue.
- Doctors routinely train in virtual reality environments, which include a haptic interface. These systems simulate the visual, auditory, and tactile experience of medical procedures, including surgery.
- Simulated patients are available for continuing medical education, for medical students, and for people who just want to play doctor.

10. Philosophie

- There is renewed interest in the Turing Test, first proposed by Alan Turing in 1950 as a means for testing intelligence in a machine. Recall that the Turing Test contemplates a situation in which a human judge interviews the computer and a human foil,communicating with both over terminal lines. If the human judge is unable to tell which interviewee is human and which is machine, the machine is deemed to possess human-level intelligence.
- Although computers still fail the test, confidence is increasing that they will be in a position to pass it within another one or two decades.
- There is serious speculation on the potential sentience (that is, consciousness) of computer-based intelligence.
- The increasingly apparent intelligence of computers has spurred an interest in philosophy.

Kapitel 4

Einschätzung der Thesen durch Kurzweil

Im Oktober 2010 veröffentlicht Kurzweil das Essay „How my predictions are faring“[Kur10]. Damit reagiert er auf verschiedene Kritiken zu seinen Prognosen und bewertet sie selbst. Er teilt in diesem Dokument seine Vorhersagen aus [Kur00] und [Kur92] bis 2009 in vier Kategorien ein:

- korrekt,
- im Wesentlichen korrekt,
- teilweise korrekt,
- falsch.

Von den 147 Thesen aus dem Buch „The Age of Spiritual Machines“bewertet er 115 als korrekt, 12 im Wesentlichen korrekt, 17 als teilweise korrekt und 3 als falsch.[Kur10, S.5]. Dementsprechend sind seiner Meinung nach 86% der Vorhersagen korrekt oder im Wesentlichen korrekt und nur zwei Prozent sind falsch. Außerdem sei darauf hingewiesen, dass seine Prognosen in Dekaden eingeteilt sind. Mit anderen Worten alle Vorhersagen für 2009 sind auf die erste Dekade des 21. Jahrhunderts bezogen. In seinem Essay [Kur10] erklärt Kurzweil auch was er mit der Kategorie „im Wesentlichen korrekt“meint. Diese bedeutet, dass die Prognose nicht eingetroffen ist, aber innerhalb der nächsten Jahre eintreffen wird. [Kur10, S.6, Abschnitt 1]

Im folgenden Teil werden einige der Vorhersagen näher betrachtet und seine Begründung aufgezeigt. Da es zu viele Aussagen sind, um alle zu erörtern, werden in dieser Arbeit nur einige ausgewählte Prognosen einer Kategorie betrachtet. Diese werden gleichzeitig mit Fakten bestätigt oder wiederlegt. Außerdem werden die Aussagen verschiedener Personen, die sich vereinzelte Prognosen ausgewählt und diese für sich bewertet haben, aufgegriffen.

Zu Beginn gleich die erste Vorhersage aus der Kategorie Computer. Laut Kurzweil werden Individuen vorrangig tragbare Computer benutzen[Kur00]. Diese Aussage bewertet er als korrekt und begründet diese mit den Umsatzzahlen von Laptops in den Vereinigten Staaten. Laut den Forschungsergebnissen von iSuppli[1] wurden im dritten Quartal des Jahres 2008 erstmals mehr Laptops als Desktop Computer verkauft:

> „For the first time ever, laptop sales have exceeded desktop sales on the global level. In the third quarter of 2008, PC laptop sales increased forty percent over Q3 2007, to 38.6 million units sold. This is in contrast to desktop PCs, which dropped 1.3%, with a total of 38.5 million units sold„[Kur10, S.11].

Dem stimmt auch Drake Baer in seinem Artikel bei Tech Insider[Bae15] zu und begründet dies mit einer weiteren Umsatzstatistik, die besagt, dass im Jahr 2011 mehr Smartphones als Computer verkauft wurden.

Eine weitere Vorhersage aus dem Bereich Computer, die Kurzweil als teilweise korrekt bewertet, ist die Aussage, dass Studenten ihre Computer in erster Linie mit der Stimme oder mit einem Gerät, ähnlich einem Stift, steuern[Kur10, S.37]. Laut einer Marktanalyse von Gartner[Gar10] stiegen die Verkaufszahlen für Touchscreen-Geräte um 97 Prozent. Außerdem verweist Kurzweil auf die Anwendungen Dragon Dictation von Nuance[2] und Google Voice, welche die Erstellung von Nachrichten und Notizen mithilfe der Stimme ermöglicht[Kur10, S.37]. Diese sind nach Kurzweil beliebt, werden aber noch nicht standardmäßig genutzt.

In die Kategorie teilweise korrekt ordnet Kurzweil auch die Prognose, dass die meisten Texte durch die Verwendung von Spracherkennung erstellt werden[Kur10, S.22], ein. Kurzweil verweist in seiner Begründung wieder auf die Anwendungen Dragon Dictation von Nuance und Google Voice. Mit dieser Aussage kann sich beispielsweise Alex Knapp nicht arrangieren. In seinem Artikel im Forbes [Kna12] bewertet er diese Vorhersage als falsch. Knapp sagt, dass die Spracherkennung ein größeres Problem ist, als bisher angenommen, die Technologie aber immer besser wird. Die Aussage Kurzweils ist seiner Meinung nach falsch. Zu diesem Entschluss kommt auch Drake Baer in seinem Artikel[Bae15]. Er begründet es mit der Anzahl an Nachrichten, die täglich verschickt werden: „turned us all into a population that messages — to the tune of 20 billion SMSes and 30 billion WhatsApp messages sent each day“[Bae15]. Außerdem ist nach Drake noch immer jeder von Siri genervt.

Die Aussage, dass Keyboards immer noch existieren, aber die meisten Texte durch Sprache erstellt werden, stuft Kurzweil wiederum als falsch ein. Zwar verweist er wie im obigen Beispiel gezeigt, auf die Dragon Dictation

[1] Ein Marktforschungsunternehmen im Bereich der Elektronik, gehört seit 2010 zur IHS.
[2] http://www.dragonmobileapps.com/

Software und dessen steigender Erfolg, aber er sieht ein, dass diese nicht vorrangig genutzt wird.

Im Bereich Bildung prophezeit Kurzweil, dass sich interaktive Kursmaterialien als gängiges Lernmittel etablieren wird. In dem von Kurzweil verwiesenen Artikel der New York Times[Ric05] wird auf das schnelle Wachstum der kostenlosen, interaktiven Lernsoftware hingewiesen. Laut Kurzweil sind diese Lernmittel immer beliebter geworden, aber sie sind noch nicht allgegenwärtig, daher bewertet er seine Aussage als teilweise korrekt. Auch Alex Knapp[Kna12] kommt zu diesem Ergebnis und meint, dass technologisch alles vorhanden ist, der Gebrauch aber nicht weit verbreitet ist.

Eine Prognose, die Kurzweil als im Wesentlichen richtig einstuft, ist aus dem Bereich Kommunikation. Demnach gibt es eine Technologie, die Texte während eines Telfongespräches in Echtzeit übersetzt. Diese soll es für mehrere Sprachen geben und häufig verwendet werden[Kur10, S.50]. Seine Begründung ist ein gutes Beispiel dafür, dass man sich Argumente so drehen kann, wie man sie benötigt. Denn Kurzweil zählt einige Entwicklungen und Erfindungen auf, die zwei-wege Übersetzungssoftware verwenden oder verweist auf den Google Translator, der eine Sprachausgabe hat. Im anschließend Abschnitt versucht Kurzweil seine Vorhersage für ihn passend zu erklären, damit er sie als im Wesentlichen korrekt deklarieren kann:

> "My prediction was that translating telephone technology would be "commonly used," not that it would be ubiquitous. I suppose one could argue how "common" its use is today, but it is already available in a popular application, with Jibbigo, for example, becoming the number one iPhone app in Japan just a few days after its official launch in Tokyo. Translating telephone technology is likely to become even more popular on many phones worldwide in 2010 and 2011. On May 6, 2010, Google introduced an image-based text translation feature for its Goggles Android app that allows you to point your phone's camera at any block of text and have it instantly translated into text in your native language„

[Kur10, S.51]. In seinem Artikel[Kna12] äußert sich auch Alex Knapp zu dieser These und stuft sie als falsch ein. Seiner Meinung nach steckt die Technologie noch in den Kinderschuhe und bedarf noch eines guten Jahrzehnts der Entwicklung.

Eine These, die sowohl Ray Kurzweil als auch Drake Baer als falsch bewerten, sind die intelligenten Straßen, die selbst-fahrende Autos für längere Strecken nutzen sollen. Drake Baer verweist auf einen Artikel im Business Insider Intelligence[Gre15], der die Entwicklung der selbst-fahrenden Autos aufzeigt. Laut diesem Artikel wird das erste vollständig selbst-fahrende Auto im Jahr 2019 sein Debut haben. Genau diese Zeit hat Kurzweil auch als Verspätung angegeben und erwähnt dabei die Entwicklungspläne von General Motors[Squ08], die 2018 fahrerlose Autos auf der Straße haben wollen.

Laut Kurzweil werden 2009 Menschliche Musiker routinemäßig mit kybernetischen Musikern jammen. Diese nach ihm korrekte Aussage begründet er zum Beispiel mit der Begleitautomatik an Keyboards oder Spielen wie Guitar Hero. Alex Knapp allerdings bewertet diese Aussage als falsch. Er meint, dass "Most programs that 'create' music are pretty bad – and musicians don't jam with them„[Kna12].

Wie am Anfang des Kapitels schon gesagt, gibt es noch zahlreiche Prognosen, die auf ihren Wahrheitsgehalt zu untersuchen sind.

Kapitel 5

Auswertung

Viele der Aussagen von Ray Kurzweil lassen sich schon so interpretieren, dass ein Großteil als wahr angesehen werden kann. In den meisten Fällen argumentiert er auch mit Beispielen, die seine Aussagen unterstützen. Doch bei seiner eigenen Einschätzung dreht er sich auch viele Argumente so wie er es braucht. Zusammenfassend lässt sich also keine klare Aussage über die Wahrheit mancher Vorhersagen von Kurzweil treffen, vielmehr muss sich jeder seine eigene Meinung bilden und selbst entscheiden, ob teilweise richtige oder im Wesentlichen richtige Thesen schon als wahre Vorhersagen zählen. Dazu kann man das Essay von Kurzweil „How my predictions are faring“nur empfehlen. Meiner Meinung nach sind viele Prognosen Kurzweils wirklich eingetreten, ich würde sogar sagen über 60 Prozent seiner Aussagen sind wahr, doch die Art und Weise wie er sich manche Aussagen schön redet, finde ich nicht angemessen. Auch die Tatsache, dass er manche Aussagen in mehrere kleinere Thesen zerlegt und damit eine höhere Quote richtiger Vorhersagen erreicht, trübt in meinen Augen die Seriosität Kurzweils. Nichts desto trotz, ist Kurzweil aufgrund seiner größtenteils wahren Prognosen zu recht eine der führenden Personen im Bereich der Futuristen.

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