Outline

I. Self-driving cars are no longer Science Fiction!
   a. Humans have been dreaming of autonomous vehicles for centuries!
      i. Nightrider
      ii. Jetsons
      iii. Minority Report/Fifth Element
   b. Present-day cars are already pretty robotic
      i. Manual transmission to automatic
      ii. Entertainment in cars
      iii. GPS systems
      iv. Facebook/social media interface
   c. Most cars will drive themselves within 50 years
      i. Possible for highway travel within 10 years
      ii. Possible for travel around pedestrians/bikes within 30 years
      iii. Will be technologically possible way before it will be socially possible
         1. Legal/liability issues
         2. Privacy issues
         3. Human freedom/enjoyment of driving/right to drive

II. How self-driving cars came to be
   a. US Government interest in autonomous vehicles
      i. DARPA Grand Challenge
   b. Sebastian Thrun
      i. Wins DARPA Grand Challenge
      ii. Hired by Google to develop autonomous vehicle

III. Technological challenges of autonomous vehicles
     a. Action: steering, pedals, etc...
     b. Decision-making: maneuvering around obstacles, braking, etc...
     c. Perception: 360 degree view of car’s surroundings
        i. This is what developers are currently most preoccupied with
        ii. Cameras/lasers
           1. LiDAR used by Google car
              a. Mechanical device on top of vehicle
              b. Expensive
           2. Road signs
              a. What if spray-painted or missing?
              b. Different programming for each country’s signage
           3. Challenge: weather conditions that limit visibility

IV. Benefits of autonomous vehicles
    a. Safer – less collisions/casualties
       i. Robots are better drivers than humans
          1. Technology is constantly improving – humans are not
          2. No more distracted driving (texting!)
          3. No road rage
          4. No more intoxicated driving
    b. Increased mobility for those unable to drive
       i. Elderly
ii. Disabled
iii. Youth
c. No more traffic congestion
   i. Vehicle-to-vehicle communication reduces traffic
   ii. Road speed may be able to increase

V. How can society incorporate self-driving cars?
a. Only feasible if all cars are autonomous
   i. Technology works better in a system
   ii. Cars must be able to read one another’s actions
       1. Human-operated cars are unpredictable
   iii. Self-driving car lanes separated from human-operated vehicles
b. Cars may toggle between self-operation for highways and manual-operation for other roads
c. Car subscription service
   i. Change relationship between human and car
   ii. People might not have to purchase cars
d. Cars in convoy as opposed to individual pods

VI. Economic impact
a. Automobile industry
b. Insurance industry
c. Transportation industry (truck/ freight)
d. Consumer costs

VII. Legal questions
a. Nevada/California already legalized self-driving cars on roads
b. Liability issues still uncertain
   i. Operating self-driving car while intoxicated
c. Human right to drive

VIII. Ethical questions
a. How will autonomous car act when faced with questions of moral judgment?
   i. Example of swerving off cliff to avoid hitting a child
b. Privacy concerns
   i. Self-driving car compared to a car with hundreds of smart phones strapped to it
   ii. Car hacking?
   iii. Authorities assuming control of vehicle
c. Human right to drive
   i. Will manual driving be made illegal?
d. Reaction to fatalities as a result of robot error
   i. Comparison to AI soldiers
   ii. Asimov’s laws of robotics

IX. Unknown factors
a. Environmental impact
   i. Car subscription could result in less cars on the road, people may travel more frequently if they can do stuff en route, resulting in more cars on the road
ii. Car subscription could result in fewer cars being manufactured, but as they are used 24 hours a day and the technology improves exponentially, they may need to be built/repaired/recycled far more frequently

iii. Those who are presently unable to drive (elderly, disabled, youth) may join those on the road, increasing fuel consumption

b. Will autonomous cars really save us time?
   i. When commuting time is free, will it be replaced with work?
   ii. Comparison with promise of more free time with invention of more machines to do it for us – results in even more work

c. Impact of not having to drive on future generations
   i. As with all technology, the question of relying on machines to perform technical, skilled activities and its affect on the evolution of the mind/body emerges
   ii. Is all of this progress making us less capable?

X. Autonomous vehicles are inevitable
   a. As with most technology, it is outpacing our preparedness
   b. It is all about trade-offs
      i. Do the benefits outweigh the negative consequences
         1. Pros
            a. Safer driving
            b. Increased mobility
            c. No more traffic jams
         2. Cons
            a. Removal of human moral judgment
            b. Privacy issues
            c. Human life in hands of AI
   c. It doesn’t matter because it is inevitable, as is all technological progress