Project B.A.N.E

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PROBLEM STATEMENT

Ever since COVID-19 has been declared as a pandemic, there are more ways our team had initially thought that is impacted by COVID-19. With the use of computer vision, monitoring clients and employees can be accomplished to ensure proper facemask usage and proper temperature to prevent superspreader events in order to lower outbreaks. Also aside from monitoring for masks, the temperature sensor can be used for further logging. It has the ability to send a response back to the microcontroller for temperatures that indicate the range of a fever. This is so that the operators can look back on the records for the day, and for further enforcement, can be used as evidence for the county to bring in law enforcement/government for analysis of CDC guidelines among the cititzens.

However, even now that COVID-19 is an epidemic, it doesn't mean that it isn't deadly in the way of life. Vaccines have been more than available, and even yet CDC guidelines are still in place. Masks are by far more than a necessity when it comes to entering places. At this rate, it's inevitable to when society accepts that COVID-19 is just something we must adapt and live with for the rest of our lives as of the common flu.

BACKGROUND

COVID-19 has disrupted businesses and financials of many public places. How this can be resolved is businesses or there can be employees who enforce mask mandates and CDC guidelines. However, some businesses don't have the money for that and are disrupted by their tasks to do so. What this project solves is the idea of using automation through artificial intelligence and computer vision so that it can be able to detect if someone is wearing a mask and taking their temperature at the same time, so that employers don't have to spend extra money, especially when money is low. (Figure 1).

SUMMARY OF WORK

COVID-19 Face Mask Detector
Uses microcontroller applications to utilize hardware through the GPU.
- Sends an audio output if the client is wearing a mask or not
- Uses LEDs to also indicate if the client is wearing a mask or not, also contains a temperature sensor.
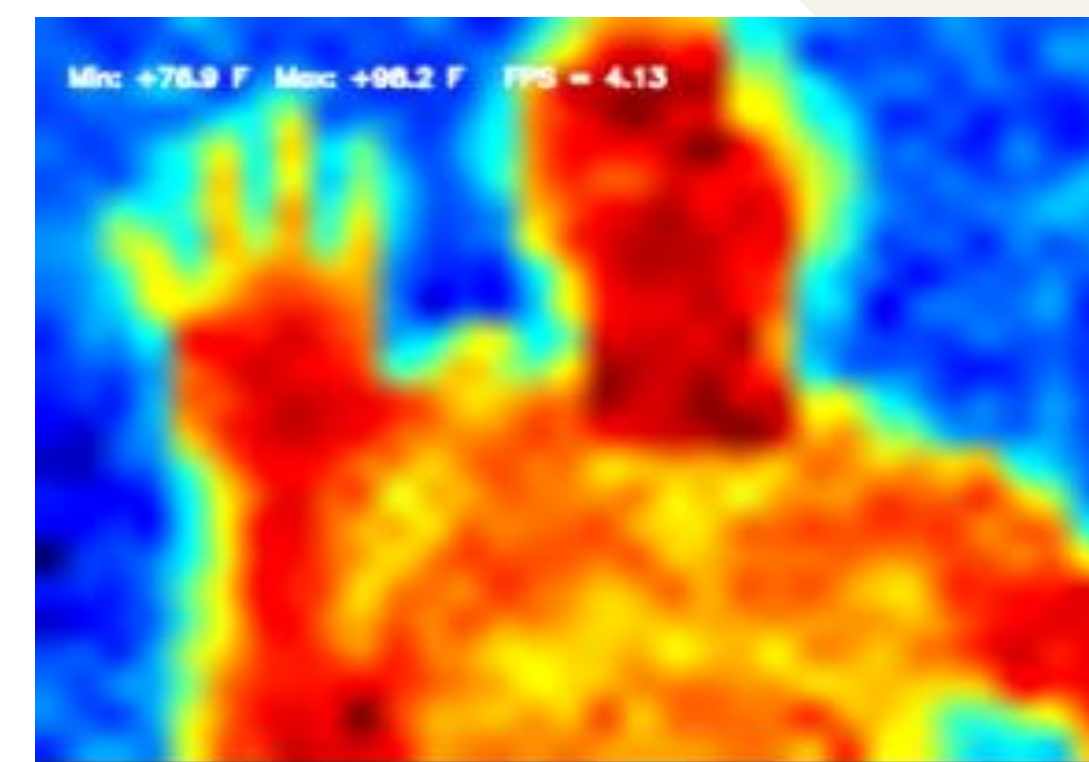

Mask on!: (100.00%)

Minc +76.9 F   Max +98.2 F   FPS = 4.13

Figure 2: (above) Example of AI making a decision in confidence rating if a client is wearing a mask or not.
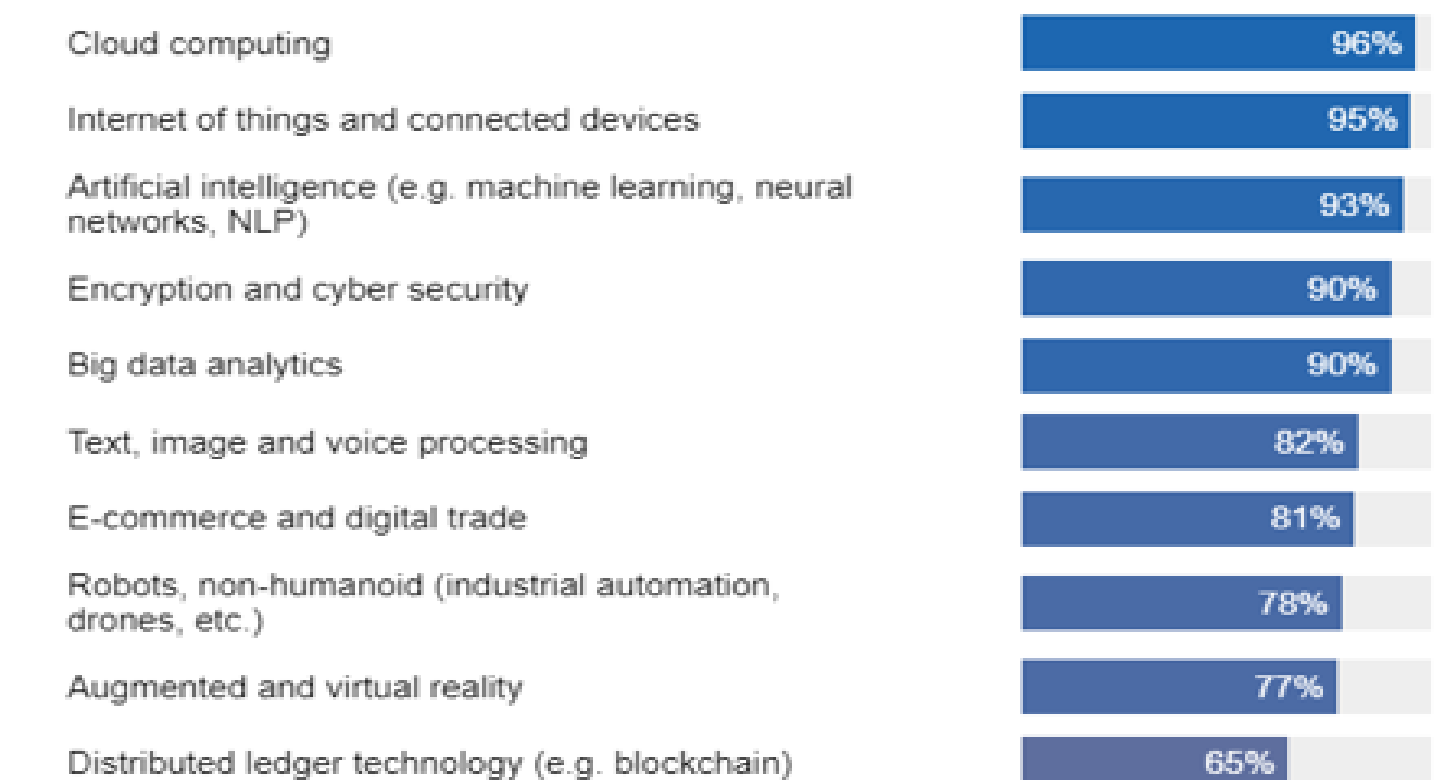*Figure 4:   (left) View through temperature sensor indicating the highest temperature of the subject. If higher than fever range, it will log it.*

IMPACT ON COMMUNITY

Technology adoption
Share of companies surveyed

Cloud computing	96%
Internet of things and connected devices	95%
Artificial intelligence (e.g. machine learning, neural networks, NLP)	93%
Encryption and cyber security	90%
Big data analytics	90%
Text, image and voice processing	82%
E-commerce and digital trade	81%
Robots, non-humanoid (industrial automation, drones, etc.)	78%
Augmented and virtual reality	77%
Distributed ledger technology (e.g. blockchain)	65%

Survey conducted by the World Economic Forum by share of companies across different sectors across America. Among the top 3 adoptions, various sectors averaged 93% in adopting artificial intelligence.:
- Due to the peak of the pandemic, various sectors wished to adopt artificial intelligence
- Since the core of the project revolves around AI, this can be shown for further development across sectors so that businesses tasks don't have to worry about superspreader events.
- From the demand, tech companies can recognize that artificial intelligence is in high demand than ever and can develop business models so that it would mask working easier. Thus opening a new market between the company and consumer