5.0 Summary of Requirements Section

In this section I have written requirements for the project. In more concrete, requirements from data science and application requirements. Firstly, data set requirements which is about necessary number of photos needed, what type of photos acceptable and how data should be split between training and testing. Secondly, about machine learning algorithms requirements, that my system must implement at least 1 algorithm and should try to test with few other algorithms. Third section is about computational resources used or required, which is basically set up I was using for the project, another solution would be using web services like Azure or Amazon web services. 5.3 Section is about project success requirements, basically for this project to succeed I need to fulfil those requirements to consider this project as a success. 4th section is about functional system requirements which is about application itself and how application should be working. 5th section is about non-functional requirements which I have written for possible future development plans as well as how application should be made.

5.1. Data Sets Requirements

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| **Number** | **Data Set Requirements** |
| **DS1.** | Data set must contain 3000 pictures with/without face masks |
| **DS2.** | Data set must contain 2000 pictures with incorrectly worn face masks |
| **DS3.** | Data set could be split into training and testing sets |
| **DS4.** | Data set must contain at least 5000 pictures |
| **DS5.** | Data should be split 80% training and 20% testing |
| **DS6.** | Data set could contain not centred pictures (person standing in a corner of a picture) |
| **DS7.** | Data set pictures could contain multiple people in it. |
| **DS8.** | Data set pictures could be given in .jpg, .jpeg, .png and possible more formats in the future. |

5.2.1. Machine Learning Algorithms Requirements

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| **Number** | **Machine Learning Requirements** |
| **ML1.** | System must be using at least 1 machine learning algorithm |
| **ML2.** | Model should be run on at least 10 epochs |
| **ML3.** | System could be tested out with 3 different machine learning algorithms |

5.2.2. Computer Resources Used

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| **Number** | **Computational Resources Used** |
| **CRU1.** | Windows 10 Home 64-bit (OS) |
| **CRU2.** | 16GB RAM |
| **CRU3.** | Intel Core i7 8th gen (CPU) |
| **CRU4.** | Nvidia GeForce GTX 1060 6GB (GPU) |
| **CRU5.** | Could be used with cloud services like AWS or Azure |

5.3. Project Success Requirements (from data Science side)

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| **Number** | **Project Success Requirements** |
| **PS1.** | Model Accuracy should be above 75% |
| **PS2.** | Precision should be above 75% |
| **PS3.** | Recall should be above 75% |
| **PS4.** | F1-Score should be above 75% |
| **PS5.** | Loss should be less than 0.1 |
| **PS6.** | Must distinguish mask/no mask with at least 75% |
| **PS7.** | System could show Region of interest |
| **PS8.** | System could show segmentation map. |
| **PS9.** | System should be able to tell if person is wearing mask correctly or incorrectly. |

5.4. Functional Application Requirements for final Deliverable

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| **Number** | **Tasks** | **About** |
| **FA1.** | Take a photo | Application takes photo and after processing it with YOLO method, returns the processed photo to a user |
| **FA2.** | Return to camera | Application lets user to return to “take a photo” screen, where user can take a new photo |
| **FA3.** | Show % of Accuracy | Application lets user to see how accurate in percentage is the prediction |

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| **Number** | **Function Requirements** |
| **FR1.** | Application must be able to take a picture. |
| **FR2.** | Application must be able process the picture. |
| **FR3.** | Application must be able to show processed picture. |

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| **Number** | **Interface Requirements** |
| **IR1.** | Application must be in English |
| **IR2.** | Application must be capable to run on “Android” mobile devices |

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| **Number** | **Application Requirements** |
| **AR1.** | Application must be capable to detect face masks between 50% to 100% |
| **AR2.** | Application must be capable to process pictures in 30 seconds |
| **AR3.** | Application must be detected using “YOLOv4-tiny” method |

5.5. Non-Functional Application Requirements

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| **Number** | **Operational System Requirements** |
| **OSR1.** | Application must be using “Android” operational system |
| **OSR2.** | Application must be written in “Python” language |
| **OSR3.** | Application must be working on Android 9+ version |
| **OSR4.** | Application could be working on Android 4.4+ |

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| **Number** | **Possible Future System Requirements** |
| **PFSR1.** | Application could be using mobile data / Wi-Fi . |
| **PFSR2.** | Application could be using phone storage to save and store pictures taken. |
| **PFSR3.** | Application could be using email to login into application |