Tool Condition Monitoring in Machining Process

The Tool Wear

- Change of shape of the tool from its original shape
- Breakdown and gradual failure of a cutting tool due to regular operation

Adverse Effects

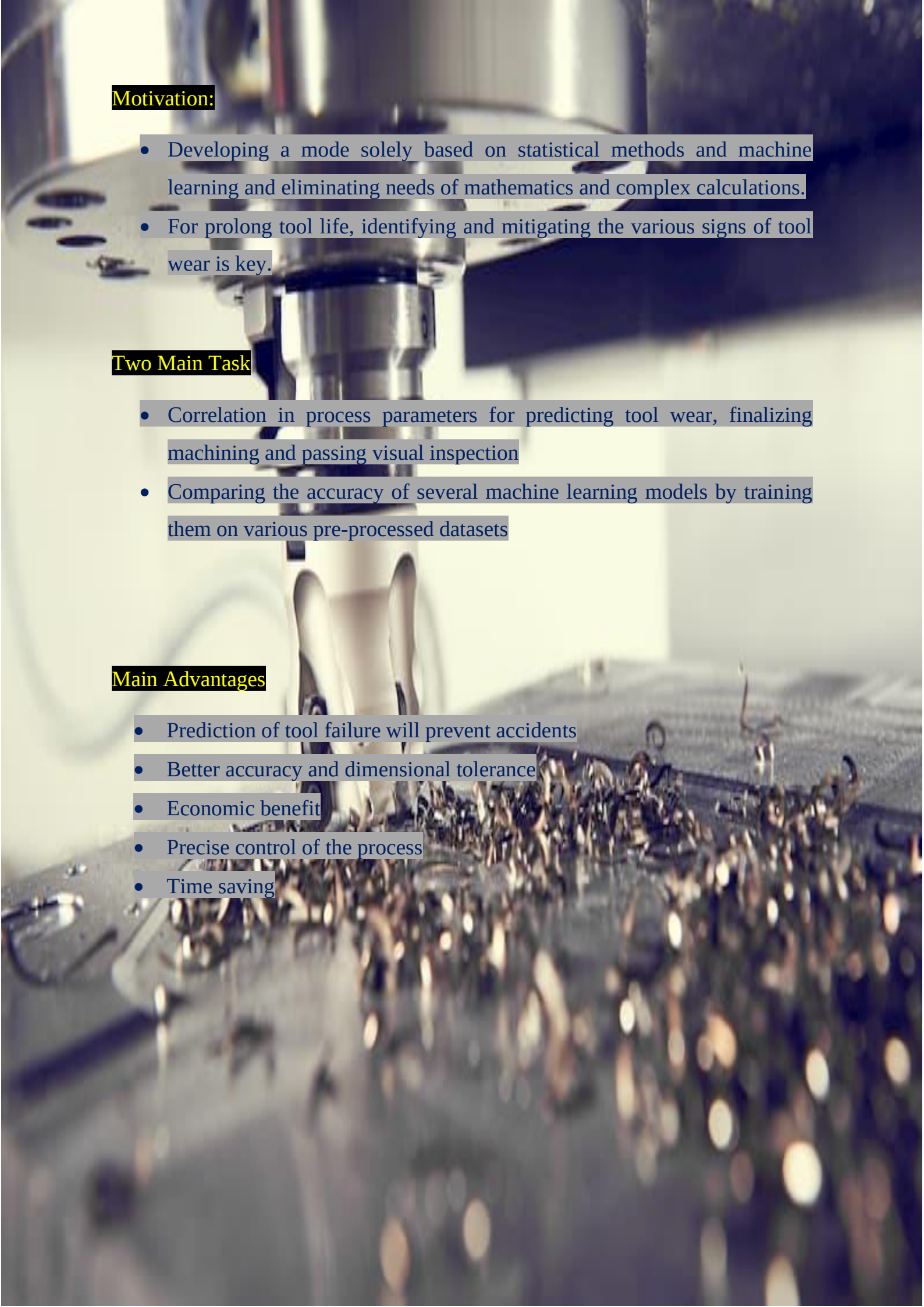
- Causes inconsistency
- Poor surface finish and poor dimensional tolerance
- Overheating of Tool
- Excessive surface roughness
- Unwanted effects on workpiece
- May lead to tool failure

The factors causing tool wear

- Mechanical abrasion from workpiece
- Excessive loads and shock loading during operation
- Extreme temperature fluctuations
- Improper speed and feed

Tool Condition Monitoring

- Keeps machine tool in good condition and spot tool wear in metal cutting
- Identify abnormal conditions by detecting loss of original functionality of the tool



Motivation:

- Developing a mode solely based on statistical methods and machine learning and eliminating needs of mathematics and complex calculations.
- For prolong tool life, identifying and mitigating the various signs of tool wear is key.

Two Main Task

- Correlation in process parameters for predicting tool wear, finalizing machining and passing visual inspection
- Comparing the accuracy of several machine learning models by training them on various pre-processed datasets

Main Advantages

- Prediction of tool failure will prevent accidents
- Better accuracy and dimensional tolerance
- Economic benefit
- Precise control of the process
- Time saving