* 1. Introduction

For my NEA project I will be creating a bicycle part picker which will provide you with a vast selection of different bike parts ranging from the frame, pedals, wheels, suspension etc. It will also provide a live 2D visual representation of the bike itself as the parts are being selected.

* 1. Background

I have been working on bikes for a while now buying them and flipping them for profit, during the time I have learnt a lot about bicycles but also faced many difficulties where I was not able to find the specific part which I was looking for due to the lack of generalization. I believe my part picker project will make it a great amount easier for not only bike mechanics/workshops but also individuals looking to upgrade their bike whilst being able to simultaneously visualize it and ensure correct compatibility.

* 1. Research

**User:** I have discussed my idea with users to gain their feedback on which aspects of the website would be most useful to them.

**Similar Solutions:** I have investigated numerous websites that are similar to my proposed object, and summarised my finding in the subsection below.

**Technical Challenges:** There are a number of technical challenges with my proposed project. In this section, I explore these with a view to understanding which I can address within the timescales for the project.

I have also researched the method behind being able to provide a live visual 2D representation of the bike as it is being created. To achieve this, I found that I would have to create a database collection of bike parts assigned to their images and then create a general format/sizing of the bike parts and how they will be presented. I also researched a method called data scraping in order to gather larger amounts of data about bike parts without it being too time consuming.

1.31 User

I did this by emailing a few local bike shops in Bedford in order to gain feedback on what features they would find helpful in a bike part picker, this helped me to narrow down which features I should focus on in my project such as compatibility of parts, visual representation etc.

1.32 Similar Solutions

To begin my project, I started by researching a few websites of the idea that I wanted to do and I was able to find a few examples each of which happened to miss key desirable features that was requested by the bike shops I spoke to. A great example of this is [Bellingham Bike Shop | Custom Mountain Bikes | Mountain Bikes](https://www.fanatikbike.com/), it has great features such as 2D visual representation as you are building the bike and automated compatibility checker by narrowing down your selection, however the website UI is difficult to navigate and there is only a small selection of bike parts to choose from. I aim to include the necessary functionality features whilst providing a reasonable range of parts to choose from and provide a user-friendly UI.

1.3.3 Technical Challenges

1.3.3.1 Gathering large amounts of data:

When beginning my project, I had to consider the main aspects of my project one of them being how I was going to gather the actual data of the bike parts and collect them into a database within the timeframe provided. One of the methods which enabled me to be able to achieve this was website scraping using the python Beautiful Soup library, it helps to simplify web scraping by parsing HTML, and allowing you to save it into a CSV file making data extraction easy and efficient.

1.3.3.2 Representing the 2D Images

I had to deeply consider how I was going to achieve arguably the largest aspect of my project. Live 2D Visualisation of the bike as it is being built. The initial idea of having to physically map bike parts to a layout seemed rather daunting so I did some research and found that I could create a general template for pre-assigned images. I have collected the numerous images through the use of website scraping and saved them into a database so that they will automatically be represented onto the frame through the necessary code.

1.3.3.3 Ensuring part compatibility

Dissimilar to gathering large amounts of data, I had no other option but to manually define the general rules for compatibility. Luckily for me I had a previous knowledge of bikes allowing me to create hidden filters for selecting the parts, it will automatically display if a part that has been chosen will or will not be compatible with one another.