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GT Data Analytics Boot Camp

Homework 5 – MatPlotLib

For this homework we were given the choice of two assignments. I had opted to complete the assignment having to do with analyzing data about pharmaceutical research as it was suggested that this would be the more difficult of the assignments to complete. In the assignment we were tasked with taking data about the spread and growth (or decay) of cancer cells present in lab mice in order to try to determine the effectiveness of various drugs in dealing with the cancer. To help accomplish this we were tasked with creating a number of graphs for each drug: Time vs Number of Metastatic Cancer Sites, Time vs Tumor Volume, Time vs Number of Still Living Mice.

Our data and graphs show that the drug Capomulin performed much better in all areas than each of the other specifically mentioned drugs. Mice who received Capomulin on average experienced a *decrease* in tumor volume and while they did see a slight rise in the number of metastatic cancer sites this increase was far lower than that of the other drugs in the sample. Mice receiving Capomulin had the highest survival rate with 21 of the original 25 mice surviving until the end of the treatment cycle.

On the other hand, the other two drugs did not seem to perform any differently compared to a placebo in regards to survival rate and tumor volume increases. Infubinol does seem to have had some effect on slowing the increase in the number of metastatic cancer sites but as mentioned it pales in comparison to Capomulin. Also, although obvious, our data shows a clear correlation between increased tumor volumes and mortality.

There are some potential issues when working with this data, and that is that mice who have died are removed from our sample from that point on. If those mice who would have died would have magically been kept alive and the cancer allowed to continue to grow, I would expect to see an increase to tumor growth for each drug in question. Imagine if you will a scenario that you have a drug that acts as a miracle cure for cancer for all right-handed people but aggravates the cancer in and almost instantly kills any left-handed person who takes it. We administer the drug to 50 people, half of whom are right-handed and the rest left-handed. All left-handed people die shortly after beginning treatment, but by the end of the treatment we see that our remaining participants report having absolutely no remaining cancer cells. If we were to look at only a graph of tumor volume over time *of the remaining living participants* one might mistakenly think that the drug really is a miracle drug without seeing the horrible truth. Although this example is an extreme one, and certainly nothing so extreme is happening here, it is worth keeping in mind that seeing any deaths during treatment is cause for caution.