**Capstone A Notes**

Problem Statement (One sentence):

How do we minimize sliding while drilling a horizontal oil well?

Problem Statement (Detailed):

The process of drilling an unconventional well is an expensive task.  On average the company takes 7 to 10 days to reach total depth (TD) which ranges from 14K ft to 16K ft measured depth (2.5 miles to 3 miles).  The cost to drill a well to TD will range from $1.2 million to $1.6 million dollars’ worth of capital expense.  To reduce capital spend a method would be to increase the rate of penetration (ROP) which means it would take less days to drill to TD.

The time series data captured allows us to determine when the drill is rotating or sliding while the rig is drilling.  When the drill is rotating, it is moving efficiently through the subsurface rock layers.  When the drill is sliding the ROP has slowed which increases the time it takes to reach TD of the well.  The company wants to determine what attributes can indicate sliding before it happens and what parameters influence the sliding.  The goal is to create a model that can show trends prior to sliding and give guidance on what parameters to adjust as drilling to limit sliding.

Published Capstone Projects:

<https://scholar.smu.edu/datasciencereview/>

Articles on horizontal drilling:

<https://geology.com/articles/horizontal-drilling/>

<https://drillers.com/directional-drilling-everything-you-ever-wanted-to-know/>

<https://www.onepetro.org/conference-paper/SPE-87162-MS>

<http://www.drillingformulas.com/what-are-the-differences-between-steering-orienting-or-sliding-and-rotating/>