Week 1 - Assignment Instructions

In week 1, we introduced many sensors and discussed them quite briefly.  In future weeks we will do a deeper dive on the different sensors used in wearables.  We thought that a great place to start using sports wearables is with a pretty straightforward device called VERT (that we have used in the workbook for this week as well).  It is nice because it is used by high level athletes in the sport of volleyball to help keep track of training and competition load.  In addition, it also provides measures of “highest jump” within each session and can thereby provide a performance measure as well.

In the workbook, we have had a look at all of the session data from the VERT device worn by the Texas Tech Women’s Volleyball Team in the 2019 season.  It is important to note (as mentioned in the workbook) that the team used the system for practices and games that were held on their home court -- and therefore, the dataset does not represent every day of the season.

For this assessment we will use the same functions and methods to answer some new questions from the same dataset.  However, we will add in more of the many measures that VERT provides in order to get a closer comparison of the different players and positions.

**Scenario:**

In the workbook we observed (as expected) that the setters had a limited number of jumps over 15 inches -- as they are focused on setting the hitters (as opposed to making plays up and above the net like the outside hitters and middle blockers).  However, we did not include the variable “Jumps 20+” in our workbook.   So, we want to further compare the total jumps and the jumps of different thresholds (15+ inches and 20+ inches) across the different player positions and the different types of “sessions” (ie. practice, games or scrimmages).

In addition, we want to explore some different measures that we skipped in the workbook.  VERT also determines the deceleration that takes place upon landing to provide feedback about the landing impact.  They refer to a high landing impact as an “elevated landing” -- and these elevated landings are further defined as being “high landings” if they are above 15 G’s (15 times the force of gravity) or an “alert landing” if they are above 20 G’s.  The concept here is that a high landing impact will produce greater stress on the body (e.g. the joints of the athletes) and relates to less stable landings (e.g. one-legged landings) and a greater possibility of injury.  So, let’s explore these further by evaluating which player position is most prone to these impacts, when in the season they are most prominent, and what other measures might be closely associated with them.

These are the steps that you need to take to complete the assignment:

1. Load the datafile (TexasTechVBall.csv)
2. Make a copy of the dataset and set up the date and week columns.
3. Calculate the mean value for the total jumps, jumps over 15, jumps over 20 inches, and highest jumps for practice, scrimmage, and game days using the groupby function (grouping by Event Type and Position).
4. Calculate the means of the deceleration landing measures (ie. elevated landing, high landing, and alert landing) for players based on event type and position using the groupby function.
5. Plot each player for their percentage of alert landings during games (only) according to the week of the season.
6. Evaluate correlations (e.g. a correlation matrix) of the different vert measures to determine what factor(s) seem most highly correlated with the “elevated landing” measure (which is a combination of the “alert landing” and “high landing” measures).  Determine which other measures (outside of the deceleration measures) are most highly correlated with the “elevated landing” measure.  In addition to the correlation matrix, you could plot the measures that have the highest correlation with “elevated landing %”.  Use all sessions for your analyses (i.e. games, practices, and scrimmages).