Model Development Phase Template

Date	16 JULY 2024
Team ID	SWTID1720075199
Project Title	Early Prediction Of Chronic Kidney Disease Using Machine Learning
Maximum Marks	5 Marks

Feature Selection Report Template

In the forthcoming update, each feature will be accompanied by a brief description. Users will indicate whether it's selected or not, providing reasoning for their decision. This process will streamline decision-making and enhance transparency in feature selection.

Feature	Description	Selected (Yes/No)	Reasoning
ID	Unique identification number issues by hospital	No	The ID of a patient is given by the hospital but is no way medically related to that person.
Age	Biological Age	Yes	CKD prevalence increases with age due to structural and functional changes in the kidneys over time.
Blood Pressure	Blood pressure is measured by systolic or diastolic ways.	Yes	High blood pressure can damage the glomeruli (filtering units) in the kidneys, leading to proteinuria (presence of protein in urine) and decreased kidney function.

Specific gravity	Specific gravity is a dimensionless quantity that indicates how concentrated or diluted urine is compared to pure water. It is typically measured using a urinometer or a refractometer	Yes	Specific gravity provides insights into the concentration of solutes in urine, reflecting the kidneys' ability to concentrate or dilute urine appropriately.
Albumin	Albumin is a type of protein that is primarily produced by the liver and is found in blood plasma.	Yes	The detection of albumin in urine (even in small amounts, known as microalbuminuria) can indicate early stages of kidney disease
Sugar	sugar in the context of chronic kidney disease (CKD) often pertains to blood glucose levels and their management, especially in diabetic patients.	Yes	Diabetes mellitus is one of the leading causes of CKD. High blood sugar levels can damage the kidneys' blood vessels over time, leading to diabetic nephropathy.
Red Blood cells	Red Blood Cells (RBCs), also known as erythrocytes, are the most abundant type of blood cells. Their	Yes	Anemia is a common complication of CKD, characterized by a reduced number of red blood cells or low hemoglobin levels.

Pus cells	Pus cells, also known as pyocytes, are a type of white blood cell (leukocyte) that are found in pus, the thick fluid produced at sites of infection or inflammation	Yes	The presence of pus cells in the urine (pyuria) indicates an infection or inflammation in the urinary tract, which can include the kidneys, bladder, ureters, or urethra.
Pus cell clump	Pus cells clump, also known as clumped white blood cells or WBC clumps, refers to the aggregation of pus cells (primarily neutrophils) in the urine.	Yes	The presence of clumped pus cells in urine typically signifies a more severe or advanced urinary tract infection (UTI) or pyelonephritis (kidney infection).
Bacteria	Bacteria count in the context of a urine test refers to the number of bacterial colonies present in a urine sample.	Yes	Bacteria count is a crucial diagnostic tool for identifying infections in the urinary tract. A high bacteria count indicates an infection that may require medical treatment.
Blood glucose random	Random Blood Glucose (RBG) refers to a blood sugar test that measures the level of glucose in the	Yes	Diabetes is a leading cause of CKD. RBG testing is commonly used to screen for diabetes, especially in individuals with risk factors or symptoms of high blood sugar.

	blood at any given time, regardless of when the person last ate		

Blood urea	Specific gravity is a dimensionless quantity that indicates how concentrated or diluted urine is compared to pure water. It is typically measured using a urinometer or a refractometer	YES	Specific gravity provides insights into the concentration of solutes in urine, reflecting the kidneys' ability to concentrate or dilute urine appropriately.
Serum creatinine	Serum creatinine is a waste product in the blood that comes from muscle metabolism. Creatinine is produced from creatine, a molecule of major importance for energy production in muscles.	Yes	The kidneys are responsible for filtering out creatinine from the blood; when they are not functioning properly, creatinine levels rise.
Sodium	Sodium is an essential electrolyte in the body that plays a vital role in maintaining fluid balance, nerve	Yes	The kidneys help regulate sodium levels in the blood. In CKD, impaired kidney function can lead to imbalances in sodium and other electrolytes.

	function, and muscle function.		
Potassium	Potassium is an essential electrolyte in the body that plays a crucial role in various physiological processes, including nerve function, muscle contraction, and maintaining proper heart rhythm.	Yes	In CKD, the kidneys' ability to filter and excrete waste products, including potassium, is compromised. This can lead to either hyperkalemia (high potassium levels) or, less commonly, hypokalemia (low potassium levels).
Haemoglobin	Haemoglobin is a protein in red blood cells that binds to oxygen in the lungs and releases it to tissues throughout the body. This is essential for cellular respiration and energy production.	Yes	In chronic kidney disease (CKD), the regulation of haemoglobin levels is significantly affected due to the kidneys' role in producing erythropoietin (EPO), a hormone crucial for red blood cell production.
Packed cell volume	The percentage of blood volume that is comprised of red blood cells.	Yes	One of the features of CKD is anemia, which is characterized by a decrease in red blood cell mass, leading to a lower PCV.

White blood cell count	The number of white blood cells in a volume of blood, usually expressed as cells per microliter	Yes	CKD is often associated with a state of chronic inflammation. An elevated WBC count can be an indirect marker of this inflammation.
Red Blood cell count	The number of red blood cells in a volume of blood, usually expressed as cells per microliter	Yes	A decreased RBC count can indicate anemia, which is a common early sign of CKD.
Hypertension	Hypertension, also known as high blood pressure, is a common medical condition where the force of the blood against the artery walls is consistently too high.	Yes	Long-term high blood pressure can damage blood vessels in the kidneys, impairing their ability to filter blood effectively. This can lead to CKD over time.
Diabetes Mellitus	Diabetes mellitus (DM) is a group of metabolic disorders characterized by chronic hyperglycemia (high blood sugar levels) resulting from defects in insulin secretion, insulin action, or both.	Yes	Chronic high blood glucose levels can damage the blood vessels in the kidneys, leading to diabetic nephropathy, a progressive kidney disease that can eventually result in CKD.

Coronary Artery Disease	Coronary artery disease (CAD), also known as coronary heart disease (CHD) or ischemic heart disease (IHD), is a condition characterized by the narrowing or blockage of the coronary arteries due to atherosclerosis.	Yes	CKD accelerates the process of atherosclerosis due to chronic inflammation, increased oxidative stress, and disturbances in calcium and phosphorus metabolism.
Appetite	Appetite refers to the desire or craving for food. It involves a complex interplay between physiological, psychological, and environmental factors.	Yes	Appetite changes are common in chronic kidney disease (CKD) and can significantly impact the management of the condition.
Pedal edema	Pedal edema refers to swelling in the feet and ankles.	Yes	CKD impairs the kidneys' ability to excrete excess fluid and sodium, leading to fluid accumulation in the lower extremities.
Anaemia	Anaemia is a condition characterized by a deficiency in the number or quality of red blood cells	Yes	EPO is a hormone produced by the kidneys that stimulates the production of red blood cells in the bone marrow. As kidney function declines, EPO production decreases, leading

	(RBCs) or hemoglobin, leading to reduced oxygen delivery to tissues.		to reduced red blood cell production and anemia.