# Design and Fabrication of "Universal Table"

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*Abstract*— The proposed idea provides a perfect solution to the problems borne from talus disease. The simple and affordable process leaves no reason not to be accepted. Surveys tell us that there is significant need of space-saving extensible and multi-purpose tables now days but due to high prices and costly maintenance, common people are not able to use such devices. Stepping into working, effects and features of proposed device, this device doesn't have any high costs which is difficult to purchase and no tough interface. There is a plywood surface for the table. The feet of the table will be joined with the bottom of the surface with hinges so that they would be able to move up and down in a free manner as needed and will stay balanced until not commanded to move. As the user will command using the interface given, the table will extend to more than 1.5 times its size, will stay balanced and acquire the form of a square table. This square table would be able to bear a load of about 6 Kgs that is more than enough for a table of this functionality. The tilt command can be activated as well at the same time so that the table's surface will incline to the limit that user wishes and is feasible. Again, the extensible table has another feature of adjustable height. Its feet will function as inside-fit cylinders so that it would be easier to be handled by even children, or the persons with not very good height.

***Keywords:*** Multipurpose, Spondylitis, Universal, Comfort, Cervical

## I. INTRODUCTION

The necessity of comfort and provocation of modern methodologies deployed to achieve the same is directly proportional. Human beings are the only ones who are capable of achieving the sort of things that makes their living simple and well-mannered. The congestion of population and increasing number of talus patients, the universal table offers a mean that can be used as an ordinary table but can be made to adjust as we like it. The idea of a universal table that is modest at size and weight is one good medium to overcome the problem of space available at household or official uses.
The purpose of the universal table is to fulfil all the needs that are to be demanded from it as a table, and also some of them which usually aren't. Cervical Spondylitis is an inflammation of the vertebra. The persons suffering from this disease are not able to turn their neck down or look down with their neck inclined. This table has the ability to tilt itself in any direction the user needs. It can greatly reduce the agony of the people who suffer in reading while looking down. The list of technologies already available is as follows:

1) Ordinary tables (no motion)
2) Tilt-able tables (without automation)
3) Tables with customized footrest
4) Extensible tables without tilt

## II. LITERATURE SURVEY

1) The force and moment transfer behavior of joint connections continues to play an important role in the design of structures to predict, measure, and/or enhance vibrational properties. The choice of models describing the transfer behavior of the joints with constitutive or phenomenological approaches depends on the type of application. If one is interested in a local description of the friction contact a constitutive model has to be used as a basis for describing microscale process. In general, e.g. for control tasks, phenomenological joint models with reduced DOFs are used for designing model based controllers as it was outlined for semi-active joints. Such simplified models can be justified from microscale considerations. The research on semi-active friction damping in joints is in its infancy and seems to be a promising concept primarily for vibration suppression in large flexible structures.
2) Transformable space saving furniture is an innovative product that has much opportunity for future development, and a huge potential market in metropolises. The designs of transformable space saving furniture can be even more variable than those of the beds, tables and chairs on which I focused for this paper. Transformable space saving furniture provides small properties with greater space and multiple functions. Furthermore, transformable space saving furniture can be made more effective and efficient were its designers to cooperate with architects and engineers in its manufacture. Its designs could then be combined with the structures and layouts of buildings, so that the functions of both the furniture and buildings could be maximized. These kinds of innovative buildings could also save energy and lower the cost of living for people living in large cities
3) Young people cannot afford to equip an apartment or room enough necessary furniture, and this means that some objects will have to be multifunctional. Breathing space is needed. Not that interested in mundane activities like cleaning every other day, so low maintenance is required. There is currently a lack of an organizer of sorts, which leads to so much clutter. Low height furniture or mats are used, especially for eating, sitting, sleeping. Need a better system, most importantly when entertaining family, friends or colleagues. The current scenario in cities is that a lot of young professionals just starting off with their careers come from various corners of the country. Initially a large disposable income is not available. Itis unnecessary to buy large quantities of furniture serving different purposes if the need to move arises. Crave a lifestyle or aspire to live comfortably and better living. A measure to establish their independence to support themselves and the way they live.

 

### *A. Conclusion drawn from Literature Review*

The literature reviews certainly led us to a good knowledge of how different joints can be arranged to be in a continuous fashion hence rendering a meaningful motion to the parts of proposed device with the less human effort, and the ergonomics yet being intact.

## III. GAP OBSERVED

The previously designed similar products were observed to be having either higher weight or less functionality, higher cost etc. as they were either made out of heavy materials or costly design methodologies. Also, as spoken for our proposed product, it is having very simple mechanical joints it functions with, and yet there is the property of it being lightweight that will be considerably better than other products.

## IV. COMPONENTS USED AND SPECIFICATIONS

### *A. Motors*

Actually in our project work we took the use of Johnson motor as a purpose to lift the legs of table or extend the surface of it. Here with the use of motors we have the pros of getting a smooth operation on a less effort to save ultimately the human effort or provide comfort to the operator.

- Motor- Johnson
- RPM- 10
- 12 Volts
- Torque- 120 KgCm

### *B. Rack and Pinion*

Rack and pinion, mechanical device consisting of a bar of rectangular cross section (the rack), having teeth on one side that mesh with teeth on a small gear (the pinion). The pinion have straight teeth that mesh with teeth on the rack that are inclined to the pinion-shaft axis.

If the pinion rotates about a fixed axis, the rack will translate; i.e., move on a straight path.

If the rack is fixed and the pinion is carried on a table guided on tracks parallel to the rack, rotation of the pinion shaft will move the table parallel to the rack.

- Material- Plastic

### *C. Arduino Controller*

In our project we use the Arduino board to convert the commands of the operator to the mechanical work due to this the user can control the table according to his needs just by pressing the single button.

### *D. Frame*

We are using the steel frame to support the table, the overall load of the table is applied on the legs of the table so we are using the high grade of steel and same for fixing the wooden top we provided the steel slots in the frame.

- Stainless Steel- SAE 304

## V. PROPOSED METHODOLOGY

1) The proposed method will use batteries or direct supply to run the motors that will turn it into a mass-functioning beast.
2) There is a plywood surface for the table. The feet of the table will be joined with the bottom of the surface with hinges so that they would be able to move up and down in a free manner as needed and will stay balanced until not commanded to move.
3) As the user will command using the interface given, the table will extend to more than 1.5 times its size, will stay balanced and acquire the form of a square table.
4) This square table would be able to bear a load of about 6 Kgs that is more than enough for a table of this functionality. The tilt command can be activated as well at the same time so that the table's surface will incline to the limit that user wishes and is feasible.
5) Again, the extensible table has another feature of adjustable height. Its feet will function as inside-fit cylinders so that it would be easier to be handled by even children, or the persons with not very good height.

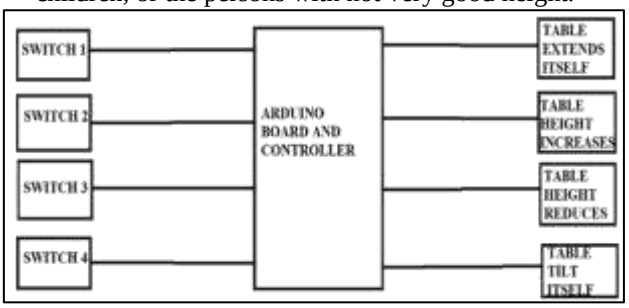


Fig. 1: Arduino Board and Controller

## VI. CONCLUSION

So finally through our project work we have concluded with following features-

- This universal table is a multipurpose table which can able to extend itself with automation technologies.
- It can also adjust its height according to the need of an individual.
- This table is also useful for spondylitis suffered persons as it can able to tilt itself according to user which provide comfort to them while studying writing or reading the things.

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